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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/609,347	07/05/2000	Robin Cheung	AMAT/3421.C1/ISM/COPPER/D	5540

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06/25/2002

Patent Counsel  
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EXAMINER
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SMITH HICKS, ERICA D

ART UNIT	PAPER NUMBER
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1741

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DATE MAILED: 06/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/609,347

Applicant(s)

CHEUNG ET AL.

Examiner

Erica Smith-Hicks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 March 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-20 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) ✓
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) ✓
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4-6.
- 4) ☒ Interview Summary (PTO-413) Paper No(s) 10.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

**DETAILED ACTION**

***Election/Restrictions***

1. This application contains claims 12-17 drawn to an invention nonelected with traverse in Paper No. 9. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.
2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-11 and 18-20, drawn to an electrochemical deposition system, classified in class 204, subclass 225+.
  - II. Claims 21-47, drawn to an electrochemical deposition system comprising an electrolyte replenisher, cleaning modules and post deposition treatments, classified in class 204, subclass 232+.

The inventions are distinct, each from the other because of the following reasons:

3. Inventions I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are not disclosed as capable of use together and provide for different modes of operation as the apparatus of Group I does not comprise the replenisher, cleaning modules and post deposition treatment embodiments of Group II and further the Group II apparatus provides for wafer transfer robots in both the mainframe and loading stations.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Atty. Robb D. Edmonds on May 30, 2002 a provisional election was made with traverse to prosecute the invention of Group II, claims 21-47. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-11 and 18-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Claim Objections***

7. The numbering of claims is not in accordance with 37 CFR 1.126.

On page 3 of Paper No. 9, there are two claims numbered as claim 10. Misnumbered claim 10, *first occurrence with steps i) and ii)*, has been renumbered as claim 9. Should applicants argue or seek further prosecution of the withdrawn claims, an amendment to the claims will need to occur to overcome this rejection.

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***Oath/Declaration***

8. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:  
Non-initialed and/or non-dated alterations have been made to the oath or declaration. See 37 CFR 1.52(c).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 21, 22, 24, 26-30, 32, 37-40 and 42-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over MAYDEN et al. US 5,292,393 and TING et al. US 6,187,152 B1.

MAYDEN et al. (hereafter MAYDEN) teach a multichamber integrated process system comprising a mainframe (see reference numeral 10, process system comprising a main frame, reference numeral 12 of Figures 1 and 2), as described in the reference at col. 4, lines 27-31; a loading station disposed in connection with the mainframe having one or more loading stations at col. 30, lines 31-35 and col. 5, lines 18-31.; and further the apparatus comprising one or more processing and post processing treatment chambers at col. 4, lines 28-32 and col. 8, line 65-col. 9, lines 1-19.

While MAYDEN teach the integrated apparatus comprising a chamber for deposition, and list various adaptations possible for the apparatus deposition tools common to semiconductor/circuit fabrication, the reference fails to expressly list electroplating/electrochemical chambers for the said deposition apparatus.

TING et al teach the deficiency in MAYDEN.

TING et al. (hereafter TING) disclose a multiple processing treatment apparatus comprising one or more electrochemical baths at col. 3, line 65 through col. 5, line 5.

MAYDEN and TING et al. in combination thus disclose all of the limitations of independent claims 21, 38 and 45. The references are combinable as they are from the same technology area of integrated processing apparatus.

It would have been obvious to a person of ordinary skill in the art to have modified the MAYDEN et al. integrated apparatus with the inclusion of an electrochemical deposition segment chamber as disclosed by TING because TING have shown where this type of deposition embodiment would have allowed for the plating benefits attendant with the functionally equivalent deposition technique of electroplating while maintaining a "closed system" that significantly reduces particulate contamination of the workpiece while undergoing treatment in a multi-process system.

Claims 22, 24 and 44 are rejected because the primary reference to MAYDEN teaches an embodiment wherein wafer transfer robots transfers the wafers between one or more cassette receiving areas and cleaning and post-treatment areas as disclosed in the reference at col. 4, lines 32-50.

Claims 26-28 are rejected because the primary reference to MAYDEN discloses an embodiment wherein first and second treatment chambers are disposed on each side of a mainframe, as shown in Figure 1.

Claim 32 is rejected because the primary reference to MAYDEN discloses a deposition system comprising rapid thermal anneal chamber(s) at col. 2, lines 7-15 of the reference.

Regarding claims 29 and 30, although MAYDEN does not expressly teach one or more robot transfer arms, the duplication of parts was held to have been obvious under

the holdings of *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). Moreover, the rearrangement of parts while maintaining the same function was held to have been obvious under *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). Therefore claims 29 and 30 are rejected as obvious modifications of the MAYDEN embodiment.

Claims 37, 39, 40, 42, 43, 46 and 47 are rejected because the MAYDEN reference teaches a transfer of wafer cassettes through a cassette receiving and pass through area and to other treatment chambers associated with the mainframe in col. 2, lines 45-55; col. 4, lines 32-50 and col. 5, lines 1-31.

13. Claims 33-34 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the MAYDEN combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of POLAN et al. US4,568,431.

The MAYDEN combination is as applied, argued and disclosed above and incorporated herein.

While the MAYDEN combination teaches an electrolyte recirculation system (see Abstract), they fail to teach a replenisher for the integrated system.

This teaching is provided by POLAN et al. who disclose an integrated processing system comprising a means for replenishing the electrolyte, chemical analysis of the solution, a rinse tank in association with the replenishing system and the system further comprising filters in col. 3, lines 10-28; and in Fig. 2 of the reference.

It would have been obvious to a skilled artisan at the time of the invention to have modified the MAYDEN combination with the replenishing system disclosed by POLAN



et al. because POLAN et al. have shown where the inclusion of the replenisher would have significantly enhanced the deposition surface of the wafer treated therein by optimizing control of the deposition solution consistency and removing impurities from the deposition solution, thus reducing surface anomalies caused by the associated impurities of untreated solutions. Still further, the replenishing/recirculation of solution would have been of cost benefit by reducing the amount of solution added to the baths, absent evidence to the contrary.

14. Claims 23, 25, 31, 35, 36 rejected under 35 U.S.C. 103(a) as being unpatentable over the MAYDEN combination as applied to claims 21, 22, 24, 26-30, 32, 37, 39, 40 and 42-47 above, and further in view of LLOYD et al. US 6,290,865.

The MAYDEN combination is as applied, argued and disclosed above and incorporated herein.

While the MAYDEN combination teaches a rinse and dry process module, they fail to disclose an integrated SRD.

This teaching is provided by LLOYD at col. 4, lines 28-52 who disclose a SRD module as a widely art used embodiment for surface treatment of a wafer during integrated processing.

The MAYDEN combination and LLOYD disclose all of the limitations of the instant rejected claims and are combinable as they are from the same technology area of multi-treatment embodiments for semiconductor substrates.

It would have been obvious to a skilled artisan at the time of the invention to have modified the MAYDEN combination with a SRD module as taught by LLOYD because LLOYD have shown that the integration of a spin, rinse and dry module would have allowed for in-situ treatment of the wafer substrate thus reducing the risk of contamination associated with loading/unloading and wafer transfer to separate rinse and dry systems and would have also reduced the overall manufacturing costs by eliminating the required operator intervention associated with this loading/unloading.

### ***Double Patenting***

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 21, 32-36, 38, 41, 44 and 45 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 9 and 10 of U.S. Patent No. 6,136,163. Although the conflicting claims are not identical, they are not patentably distinct from each other because both set of claims teach an electrochemical deposition apparatus comprising a mainframe, wafer transfer robot

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means disposed in the mainframe, and one or more processing stations whereby the processing station may be a thermal anneal chamber.


### **Conclusion**

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. KANG et al. US 6,139,700 who teach a method and apparatus for processing a semiconductor device comprising a transfer chamber for positioning work pieces at various process chambers; HENLEY et al. US 6,207,005 B1 who disclose a cluster tool comprising a wafer transfer chamber centrally located for positioning wafers at various treatment stations surrounding the wafer transfer chamber; US 5,820,692 to BAECKER et al. who teach an apparatus for processing a workpiece, the apparatus comprising a central transfer station with a transfer robot therein and a rinse and dry module.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erica Smith-Hicks whose telephone number is 703/ 305-7645. The examiner can normally be reached on Tue-Fri., from 8:00 a.m.-6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 703/ 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703/ 872-9310 for regular communications and 703/ 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703/ 308-0661.

  
NAM NGUYEN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

Erica Smith-Hicks  
Examiner  
Art Unit 1741

ESH  
June 13, 2002